

Heat Treating Equipment Setters, Operators, and Tenders

Table of Contents *(scroll or use links below to navigate document)*

[What They Do](#)

[Tasks](#)

[Skills, Knowledge, and Abilities](#)

[Work Environment](#)

[California's Job Outlook and Wages](#)

[Trends](#)

[Training](#)

[Where Do I Find the Job?](#)

[Where Can the Job Lead?](#)

[Other Sources](#)

What They Do

Heat is as important to manufacturing processes as it is to food preparation. Manufacturers subject metals and plastics to heat, cold, or chemicals to relieve or redistribute stresses and change durability, flexibility, and ductility. Products as diverse as eyeglasses, semiconductor wafers, steel, automobile tires, and plastic bags use heating as a critical step to the finished product. In the steel industry Heat Treating Equipment Setters, Operators, and Tenders heat metal sheets, blooms, billets, bars, plates, and rods to a specified temperature for rolling or processing. In the plastics industry they heat and cure preformed plastic parts.

Heat Treating Equipment Setters, Operators, and Tenders set up, operate, or tend heating equipment, such as heat-treating furnaces, flame-hardening machines, induction machines, soaking pits, baths, electronic induction machines, or vacuum equipment to temper, harden, anneal, or heat-treat metal or plastic objects.

Common titles used for Heat Treating occupations include: Heating Equipment Setter; Heating Regulator; Heat Treat Operator; Heat Treater; Heat Treating Bluer; Heat Treating Furnace Tender; Induction Heat Treater; and Heat Treating Operator.

Tasks

- ▶ Read production schedule to determine processing sequence and furnace temperature requirements for objects to be heat treated.
- ▶ Visually examine or test objects, using hardness testing equipment, to determine flame temperature and degree of hardness.
- ▶ Estimate flame temperature and heating cycle based on degree of hardness required and metal to be treated.
- ▶ Set automatic controls, observe gauges, and operate gas or electric furnace used to harden temper, or anneal metal parts.
- ▶ Light gas burners and adjust flow of gas and coolant water.
- ▶ Load parts into containers, close furnace door, and insert parts into furnace when specified temperature is reached.
- ▶ Cover parts with charcoal before inserting in furnace to prevent discoloration caused by rapid heating.
- ▶ Clean oxides and scale from parts or fittings, using steam spray or immersing parts in chemical and water baths.

Heat Treating Equipment Setters, Operators, and Tenders

- ▶ Signal forklift operator to deposit or extract containers of parts into and from furnaces and quenching rinse tanks.
- ▶ Position part in fixture, press buttons to light burners and tend flame hardening machine, according to procedures, to case-harden metal part.
- ▶ Adjust speed and operate continuous furnace through which parts are passed by means of reels and conveyors.
- ▶ Set up and operate die-quenching machine to prevent parts from warping.
- ▶ Activate and tend electric furnace that anneals base sections of hardened parts for subsequent machining.
- ▶ Test parts for hardness, using hardness testing equipment, and stamp heat treatment identification mark on part, using hammer and punch.
- ▶ Examine parts to ensure metal shade and color conform to specifications, utilizing knowledge of metal heat-treating.
- ▶ Reduce heat and allow parts to cool in furnace.
- ▶ Remove parts from furnace after specified time and air dry or cool parts in water or oil brine or other baths.
- ▶ Insert vacuum tube into bag and seal bag around tube with tape.
- ▶ Impregnate fabric with plastic resins and cut fabric into strips.
- ▶ Remove part and cut away plastic bag.
- ▶ Record time and production data.
- ▶ Position plastic sheet and mold in plastic bag, heat material under lamps, and force confrontation of sheet to mold by vacuum pressure.
- ▶ Assist workers in repairing, replacing, cleaning, lubricating, or adjusting furnace equipment using hand tools.
- ▶ Instruct new workers in machine operations.

Detailed descriptions of this occupation may be found in the Occupational Information Network (O*NET) at online.onetcenter.org.

Important Skills, Knowledge, and Abilities

- ▶ **Operation and Control** — Controlling operations of equipment or systems.
- ▶ **Operation Monitoring** — Watching gauges, dials, or other indicators to make sure a machine is working properly.
- ▶ **Reading Comprehension** — Understanding written sentences and paragraphs in work-related documents.
- ▶ **Quality Control Analysis** — Conducting tests and inspections of products, services, or processes to evaluate quality or performance.

Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

- ▶ **Mechanical** — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

Heat Treating Equipment Setters, Operators, and Tenders

- ▶ **Control Precision** — The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.
- ▶ **Information Ordering** — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
- ▶ **Arm-Hand Steadiness** — The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.
- ▶ **Near Vision** — The ability to see details at close range (within a few feet of the observer).
- ▶ **Trunk Strength** — The ability to use your abdominal and lower back muscles to support part of the body repeatedly or continuously over time without 'giving out' or fatiguing.

Work Environment

Heat Treating Equipment Setters, Operators, and Tenders work indoors in machine shops and plants where temperatures can become very hot at times due to the nature of their tasks. They must observe safety rules and be alert to the hazards of machinery constantly in motion. They often wear safety glasses, earplugs, and other protective equipment. They are on their feet most of the day using their hands.

Some manufacturing plants operate around the clock, and workers may be required to work evening, night, or weekend shifts as well as overtime when needed. As workers obtain seniority, they have more choice about shift assignments. Union membership may be available in some industries.

California's Job Outlook and Wages

The California Outlook and Wage table below represents the occupation across all industries.

Standard Occupational Classification	Estimated Number of Workers 2004	Estimated Number of Workers 2014	Average Annual Openings	2006 Wage Range (per hour)
Heat Treating Equipment Setters, Operators and Tenders				
51-4191	1,500	1,800	80	\$11.31 to \$18.83

Wages do not reflect self-employment.

Average annual openings include new jobs plus net replacements.

Source: www.labormarketinfo.edd.ca.gov, Employment Projections by Occupation and OES Employment & Wages by Occupation, Labor Market Information Division, Employment Development Department.

Trends

The number of Heat Treating Equipment Setters, Operators, and Tenders is expected to grow faster than average between 2004-2014 compared with all occupations. Job opportunities will continue to occur as workers permanently leave the occupation for retirement and other reasons.

Training/Requirements/Apprenticeships

Heat Treating Equipment Setters, Operators, and Tenders must have a high school diploma and generally receive on-the-job training from experienced workers.

Heat Treating Equipment Setters, Operators, and Tenders

Recommended High School Course Work

High school students interested in this kind of work should take mathematics, physics, and chemistry, as well as metal shop courses when available.

Where Do I Find the Job?

Direct application to employers remains one of the most effective job search methods. Candidates for training or apprenticeship programs should apply directly to employers who employ Heat Treating Equipment Setters, Operators, and Tenders.

Use the *Search for Employers by Industry* feature on the *Career Center* page at www.labormarketinfo.edd.ca.gov to locate employers in your area. Search under the following industry names to get a list of private firms and their addresses:

- ▶ Aluminum Die-Casting Foundries
- ▶ Aluminum Foundries (except Die-Casting)
- ▶ Electroplating/Anodizing/Coloring Metal
- ▶ Employment Placement Agencies
- ▶ Iron and Steel Mills
- ▶ Iron Foundries
- ▶ Metal Coating and Nonprecious Engraving
- ▶ Metal Heat Treating
- ▶ Nonferrous, ex. Copper/Aluminum, Shaping
- ▶ Professional Employer Organizations
- ▶ Steel Foundries (except Investment)
- ▶ Temporary Help Services

Search these **yellow page** headings for listings of private firms:

- ▶ Employment, Temporary
- ▶ Foundries
- ▶ Heat Treating, Metal
- ▶ Machine Shops
- ▶ Metal Stamping
- ▶ Plating

Where Can the Job Lead?

Large organizations employ several levels of Heat Treater Operators. Some operators may advance to supervisory positions.

Other Sources of Information

ASM International - The Materials Information Society
www.asm-intl.org